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EXAMINER

KANG, ROBERT N

ART UNIT PAPER NUMBER

2625

DATE MAILED: 04/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/062,990

Applicant(s)

MCDANIEL ET AL.

Examiner

Robert N. Kang

Art Unit

2625

PKC

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-44 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-44 is/are rejected.
- 7) ☒ Claim(s) 1, 12, 23, 34, 36, 40 and 43 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 January 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: ____.

DETAILED ACTION

Specification

1. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: Evaluation of Resource Requirements for Image Processing Operations in an Image Scanner.

2. The specification of the disclosure is objected to because of the somewhat confusing use of the term "parameters." Parameters are generally defined as input values used by a mathematical a set of rules or formulas to calculate output values. The invention, as the examiner understands, utilizes the settings as input values to calculate performance evaluations as output values. Thus, the settings are the parameters of the function. The application, however, confusingly includes both settings and parameters, wherein the parameters are the output values calculated. Examiner respectfully suggests changing the term "parameters" to "output values" and changing the user settable values of the output values (i.e., maximum estimated scan time, maximum RAM usage, and maximum HDD usage) as "constraints" for the sake of clarity. Another possible suggestion is to label the "settings" as parameters while specifying input or output (monitor) parameters, as shown in the Wu reference.

Claim Objections

3. Claims 1, 12, 23, 34, 36, 40, and 43 are objected to because of the following informalities: all the claims recite the limitation "a number of image processing parameters" or a "number of image processing settings." The examiner feels that this

language, particularly as used in claims 1, 40, and 43, could possibly be misconstrued by a reader to mean that the method predicts the number of output parameters associated with a given task, i.e., depending on the settings, the number of output variables changes. Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim s 14 and 27 recite the limitation "computer system" in line 3. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 1-19, 21-30, and 32-34 are rejected under 35 U.S.C. 102(e) as being anticipated by Wu (US-PAT 6,687,527).

With regards to claim 1, Wu discloses in column 7, lines 21-28, "using the graphical user interface 60, the associated user can select and modify scan sequence parameters such as the scan time, scan resolution, inter-echo spacing, bandwidth, time-

to-echo, and the like. Typically, as many as thirty to fifty parameters are included for defining an imaging scan. The various parameters are interrelated, insofar as the values of certain parameters effectively constrain the values of certain other parameters. Additionally, parameters limits exist." Wu further discloses in column 8, lines 26-33, "after receiving values for selectable MRI operating parameters from the associated user, either through the entry of individual values or by selection of a can from the master database memory 68, the user interface processor 60 calculates parameter limits and monitor parameter values therefrom. The results are displayed to the user, preferably in a graphical format, on the display 50."

Therefore, the parameters in Wu are analogous to the settings, and the monitor parameters are analogous to the parameters of the applicant's invention. FIG. 3 shows that the monitor parameter values are calculated, or "forecasted" in step 510, which is part of a loop. Therefore, the user may "alter the at least one image processing setting based upon a user input" in step 524, at which point the flow loops back to 508, and subsequently, 510, thus "re-forecasting the number of image processing parameters based upon the at least one image processing setting based upon the at least one image processing setting altered by the user setting input." Finally, it is obvious that at step 522 the user may initiate either a simulation scan 544, MRI scan 542, and optimization algorithm 530, thus qualifying as "performing a preoperative task based upon a user input in response to the display of the image processing parameters."

Claim 12 is merely claim 1 re-written as a program and lacking the final step; claim 23 is merely claim 1 re-written as a system including a processor and memory,

both of which are anticipated by Wu; claim 34 is merely the counterpart system claim to program claim 12; therefore, all of the aforementioned claims are anticipated by Wu.

This parallelism is evident in other redundant claims of the pending application and will not be further emphasized.

Regarding claims 2, 15, 25 and 3, 16, 26, Wu discloses in column 11, lines 53-69, "the embodiment of the second display area 200 shown in FIG. 2B includes indicators to warn the user when certain parameter values enter particularly undesirably regions. The user is cautioned 250 when the estimated SNR 202 decreases below .4 on the relative scale 212, since imaging conditions corresponding to estimated SNR values below that level typically produce sub-optimal image quality." This is performed for the various other monitor parameters and thus qualifies as "associating at least one threshold with at least one of the processing parameters, thereby providing a performance benchmark with which a value for the at least one of the image processing parameters may be compared." Additionally, since this value is not created by the user, it is "automatically determined" by the user interface processor 60. Therefore the invention as disclosed in the aforementioned claims is anticipated by Wu's invention.

With regards to claims 4 and 5, FIG. 3 of Wu's disclosure shows a decision block 522 wherein the user may choose to perform MRI scanning in step 542. This comprises "initiating the image processing operation," as claimed by claim 4. FIG. 3 also depicts a

step to enter new parameter values either manually (524) or via an optimization algorithm (530). Both of these comprise "canceling the image processing operation."

In regards to claims 13 and 24, FIG. 3 shows a decision block 522 wherein the user may choose to perform MRI scanning in step 542. Therefore, this qualifies as "execution of the image processing operation based upon a user input."

Regarding claims 14 and 27, Wu discloses in column 7, lines 28-32, "parameter limits exist. Some parameter limits are hardware specific, e.g., the magnets 12 have physical maximum magnetic field strength limitations, the gradient amplifiers have maximum slew rate limitations, and the like." Wu further discloses in column 14, lines 43, "the user interface processor 60 calculates minimum and maximum limit values for each selectable parameter in a step 508." Therefore, it is impossible to execute an image processing operation when a parameter (setting value) is placed at a value outside of the hardware limited minimum and maximum values. Therefore, Wu's system "prevents execution of the image processing operation when the computer system is incapable of performing the image processing operation."

With regards to claims 6, 17, and 28, Wu discloses in column 15, line 57 to column 16, line 2, an optimization process which "can be improved upon by defining a desirability function an optionally using an automated mathematical optimization routine. Preferably, the user has the option of selecting such a routine, e.g. by operating an

'Optimize' button 146 (FIG. 2A) displayed in the first area 100, to run an optimization algorithm in a step 530. In a preferred embodiment, when the parameter values are such that an optimization routine can be appropriately run, the optimize button 146 becomes 'active' and allows the optimization to drive the parameter values to an optimized solution, e.g. a solution that maximizes a desirability factor." Thus Wu's invention anticipates "automatically determining an optimum configuration for the at least one image processing setting to perform the image processing operation."

In regards to claims 18 and 29, requiring code/logic that "withholds at least one of the image processing settings from an automated optimization operation," Wu discloses in column 19, lines 14-25, "the identification of the fixed parameters can be hard-coded into the optimization routine, or the user can selectively identify which parameters to keep fixed." Therefore, the user may choose to hold a parameter at a given value and restrict the optimization routine from changing the settings automatically. Thus the Wu invention anticipates the functions of claims 18 and 29.

Regarding claim 7, the user as well as the optimization algorithm is constrained by operating curves as shown in FIG. 2E when selecting input parameter values. Wu discloses in column 13, lines 39-48, "the operating curve 420 relating EP readout gradient area with EIP readout cycle period tau is exemplary only. Operating curves corresponding to many other relationships between parameter values and parameter limits can be plotted in similar fashion. The selected plots preferably depend on the

sequence being set up (e.g., the EP sequence) and the type of optimization the user is performing (e.g., minimize scan time, maximize resolution or SNR, et cetera)." Wu further discloses in column 15, lines 13-18, "attempting to enter an illegal parameter value or combination of values... by moving the cursor 432 of the operating curve into the forbidden region 430 will result in the parameter moving to an extreme limit value and no further." Thus, the output parameter level is constantly monitored and disallows input parameter values which result in output parameter levels in the forbidden range. Therefore, the automatic optimum configuration "comprises determining whether at least one of the image processing parameters exceeds at least one threshold associated therewith."

Regarding claim 8, Wu discloses in column 7, lines 21-28, "using the graphical user interface 60, the associated user can select and modify scan sequence parameters such as the scan time, scan resolution, inter-echo spacing, bandwidth, time-to-echo, and the like." Therefore, these qualify as "scan settings," and Wu anticipates the functionality of claim 8, requiring that the forecasting comprises "forecasting the image processing parameter based upon the at least one image processing setting that includes a number of scan settings."

With regards to claim 9, Wu discloses in column 10, lines 32-35, "as shown in the preferred embodiment of FIG. 2B, exemplary [monitor] parameters include an estimated signal-to-noise ratio (SNR) 202, a spatial resolution 204, an imaging time 206, a safety

factor 208, and a weighting 210.” Wu discloses in column 7, lines 21-28, “using the graphical user interface 60, the associated user can select and modify scan sequence parameters such as the scan time, scan resolution, inter-echo spacing, bandwidth, time-to-echo, and the like.”

Thus, the calculation by the processor 60 of the imaging time 206 from the input parameters disclosed comprises, “determining an execution time of the image processing operation based on the at least one image processing setting, wherein the image processing operation is a scan operation and the at least one image processing setting includes at least one scan setting.”

Examiner asserts that claim 9 encompasses the functionality of counterpart program claims 19, 21, and 22, as well as the functionality of counterpart system claims 30, 32, and 33. Claims 22 and 33 in particular require “at least one of the processing settings is selected from the group of scan resolution, color depth, and page size.” Since one of the selectable parameters in Wu's invention is scan resolution, it is obviously selected from the aforementioned group. Thus all 7 claims are anticipated by the Wu invention.

Regarding claim 10, Wu depicts in FIG. 2B an example of the monitor parameter output, wherein on display 206 the imaging time is graphically depicted. Item 254 corresponds to a caution time that is excessively long. Therefore, Wu's invention “compares the execution time with at least one execution time threshold to obtain a measure of the performance of the image processing operation.”

In regards to claim 11, the monitor parameter display shown in FIG. 2B is an "operation evaluation message on the display device indicating an expected measure of performance of the image processing operation." Thus the claim is anticipated by Wu.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. Claims 20, 31, and 35-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wu (US-PAT 6,687,527) in view of Abe (US-PAT 6,850,653).

Wu's invention meets the requirements of claims 12 and 23, upon which claims 20 and 31 respectively depend. Wu does not expressly disclose "estimate[ing] a minimum amount of at least one type of memory that is necessary to perform the image processing operation" as one of his monitor/output parameters.

Abe discloses a method of scanning an image in column 7, lines 38-41, wherein "when scanning is started by clicking the operation button 29 (step S1201), an error flag and warning flag are cleared (step S1216), and an available memory area check is made (step S1202)." Abe further describes this memory check in column 8, lines 15-25, stating, "FIG. 13 is a flow chart showing the processing in the available memory area check in step S1202 in FIG 12... When the operation 29 is clicked during the standby state of the scanner 5 to start scanning, and an available memory area check is started (step S1301), a check is made (S1302) on available capacity of data storage are of memory (RAM 11)>(necessary memory capacity+1)[MB]." Additionally, Abe's invention modifies scan settings to lower resolution, size, or color depth when there is insufficient memory to store the scanned image.

Wu and Abe are combinable because, although they are from different fields of image scanning, they deal specifically with adjusting scan settings or parameters in order to meet a threshold of an output parameter value. Furthermore, the two inventions approach the problem in an almost identical fashion.

Therefore, it would have been obvious at the time of invention to one of normal skill in the art to include in Wu a method of calculating the RAM required to store the image as one of the output monitor parameters as disclosed by Abe.

The motivation of this modification would be to disallow scan settings which results in an image requiring a prohibitively large amount of RAM or more RAM than is available on the imaging system.

Thus it would have been obvious to combine Wu with Abe to obtain the invention as disclosed in claims 20 and 31.

Examiner asserts claim 35 is merely claim 12 with the added limitations of claims 13, 14, 19, and 20. Because Wu's invention alone meets the requirements of claims 12, 13, 14, and 19, and the Wu/Abe combination meets the requirements of claim 20, the Wu/Abe combination meets the requirements of claim 35. Thus the invention as claimed in claim 35 is unpatentable over the Wu/Abe combination.

Examiner contends that claim 36 is merely the last limitation of claim 12 with the added limitation that alteration must occur "manually," depending on claim 35. Since it has been well established that Wu's invention allows for the user to modify the image processing settings manually, as seen in step 524 of FIG. 3, claim 36 is unpatentable over the Wu/Abe combination as well.

Claim 40 is merely claim 1 with limitations 3 and 4 removed while adding the requirements of claims 19 and 20. Essentially, it is the method counterpart claim that encompasses the functions described in claims 1, 19, and 20. Because Wu's invention alone meets the requirements of claims 1 and 19, and the Wu/Abe combination meets

the requirements of claim 20, the Wu/Abe combination meets the requirements of claim 40. Thus the invention as claimed in claim 40 is unpatentable over the Wu/Abe combination.

Examiner asserts claims 37 and 44 are identical in function to claims 6 and 17, and therefore are unpatentable over the Wu/Abe combination as well.

Likewise, claim 38 is identical to claims 21 and 32, and therefore unpatentable over the Wu/Abe combination.

Finally claim 39 is identical to claims 22 and 33, and therefore unpatentable over the Wu/Abe combination.

With regards to claim 43, which merely takes limitations 3 and 4 of claim 1 (which are missing from claim 40) and defines them as the "preoperative task," Wu depicts in FIG. 3 the user is able to change the setting values in step 524. This occurs before the actual image processing, and is therefore a "preoperative task." Thus claim 43 is unpatentable over the Wu/Abe combination.

Claims 41 and 42 are identical to claims 4 and 5 in function with the exception that they depend on claim 40, which is rejected by the Wu/Abe combination. Since the Wu/Abe combination obviously contains the functions and features of Wu itself, and

claims 4 and 5 are rejected by Wu's invention alone, it is obvious that claims 41 and 42 are unpatentable over the aforementioned Wu/Abe combination.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Hisatake (US-PAT 6,065,036) discloses a method for calculating the estimated scan time based off the number and priority of job. Hashimoto (US-PAT 6,028,966) discloses a method of optimizing scan parameters from a prescan. While it does not meet the date of the application, the Picza LPX-1200 3D laser scanner on page 33 of the user's manual depicts a preview window which allows the user to adjust various scan settings and outputs the amount of memory the scan requires as well as the estimated scanning time.


Examiner would like to inform the applicant that art unit 2622 has been re-designated as art unit 2625 due to organizational restructuring with the Patent & Trademark Office.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Robert N. Kang whose telephone number is (571) 272-0593. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, ^{Twylr Lamb} ~~Edward Coles~~ can be reached on (571)272-⁷⁴⁰⁶ ~~7402~~. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


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